

Retro-Look Digital Rangefinder Camera Merges Tradition with Innovation

By John Boyd

Unique is a much overused word these days, but it aptly describes Epson's R-D1, the first and (at the time of writing) only digital rangefinder camera in the world. The R-D1 is also the first digital camera to accept Leica L- and M-mount lenses and it incorporates the world's first coincidence-type viewfinder with 1× magnification.

In designing the R-D1, Epson went back to the future to come up with a product that marries the best of traditional rangefinder design with the advantages of high-performance digital photography. The camera's appealing retro-look is much more than cosmetic: It dictates the choice and omission of features and functions, while underscoring the priority put on manual operations. What appears to be a redundant film advance lever, for instance, is actually used to re-cock the shutter after taking a picture. Such novel thinking and attention to engineering detail is apparent throughout every aspect of the camera's design.

Given Epson's leadership role in digital image processing and photo printing technologies, the company views the R-D1 as an apt vehicle to extend Epson's influence to the frontend of the photo business: the actual picture taking. The novel

camera is also seen as a product that will showcase the company's inventive spirit, expertise in digital imaging, and skills in mechanical precision engineering.

Isao Edatsune, general manager of inkjet printer and photo product planning at Epson, first conceived of the R-D1 near the end of 2001. "The governing design philosophy was to create a digital camera that felt, looked and operated just like a traditional film camera," says Edatsune. "The kinds of user we have in mind are professional photographers and those involved in digital-image-based art work, as well as high-end camera enthusiasts." Among these groups are aficionados who prefer the look, feel and unencumbered features of a film camera, yet also want to take advantage of the advances made in digital image processing. "The R-D1 enables these devotees to do just this, without having the electronics get in the way of picture creating and taking," Edatsune adds.

After he convinced top executives of the camera's merits, Epson enlisted optical specialist Cosina Corporation in 2002 to help with the camera's optics, while Epson took responsibility for everything else, including manufacturing.

The rangefinder design is preferred because it has a number of advantages over single-lens reflex (SLR) cameras. These include a brighter viewfinder, silent action, less vibration and no blackout at the instant of picture taking. In addition, because there is no moving mirror as with



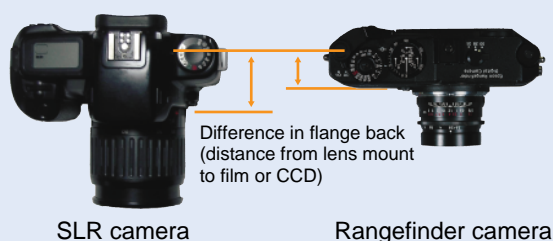
The Epson Rangefinder Digital Camera R-D1

the SLR, the distance between the lens mount and the surface of the film is shorter, making for a significantly slimmer, less bulky camera body, as well as more compact lenses. All these advantages combine to create strong appeal for many fans of traditional cameras around the world.

Yet the vaunted slimness of the rangefinder design turned out to be a major obstacle when Epson came to incorporate a six-megapixel CCD (charge coupled device) APS-C image sensor, which has an area six times that of the 2/3-inch CCD used in most compact digital cameras. The lack of depth meant that there was little space with which to channel the light rays entering the camera via the lens. Therefore the rays of light had to be acutely angled in order to have them focus correctly onto the CCD so as to render a faithful image. "This was our biggest challenge," says Edatsune. "And we needed to call on all our experience in precision engineering to meet it."

The effort has been worthwhile. Now owners of Leica L (with adapter) and M mount lenses around the world have the opportunity to use over 200 of these lens

Merit of the rangefinder system=thin body



types in an advanced twenty-first century digital rangefinder camera.

To get the best out of this optical treasure chest of lenses, the six-megapixel CCD APS-C imaging element has been designed to create an image size of 23.7 mm × 15.6 mm. This ensures that only the central, highest performing area of a lens is used. To convert the focal length to 35-mm film size, a conversion factor of 1.53 is used. For example, the focal length of a 50-mm lens would be 75 mm. A handy guide on the back of the camera provides common focal length equivalents. And in another of the R-D1's clever design twists, this hinged guide section can be reversed to reveal a 2-inch 235,000-pixel color LCD

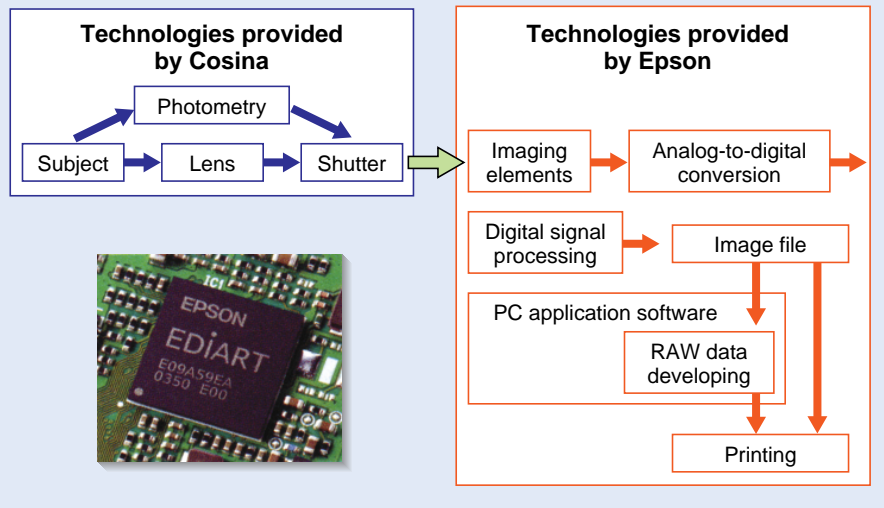


The needle indicators on the R-D1

monitor. Photographers can use this big, bright display to immediately check the image just taken, as well as review previously stored images. Folding it away inside the body when not in use protects the display and conceals the camera's only prominent digital design element.

"We think the 1× rangefinder viewfinder is another innovation that serious photographers will appreciate," says Edatsune. "It allows the user to check the field of view with both eyes at the same time: composing a scene through the viewfinder with one eye, while simultaneously viewing the subject's surroundings with the free eye."

Image Processing in the R-D1



Another example of the length Epson has gone to in stressing the camera's mechanical look and feel is the set of analog needle indicators on top of the camera. The chronograph-like indicators reflect the watch movement technology that Epson has developed over many years and show remaining battery life, white balance, shooting quality and the remaining number of pictures that can be taken. Similarly, the film rewinder has been transformed into a jog dial for making adjustments in the settings. The shutter speed control is similar to those found on film cameras, providing settings from 1 to 1/2000 second. Exposure modes available are aperture priority, auto-exposure, and manual. Images are stored in an SD flash memory card, which currently are available in various capacities up to 1 GB.

The advanced digital image processing skills that Epson has developed in designing and manufacturing its printers and scanners are also present in the R-D1, such as its refined algorithms for analog-to-digital conversion of the CCD data and for color processing. Moreover, the company's original image processing software, including 3D-LUT (look-up table) is used to process the analog CCD data into full-

color digital images in JPEG 3M (2,240 × 1,488 pixels), JPEG 6M (3,008 × 2,000 pixels) and RAW (9 MB) formats. All these options are aimed at producing true-to-life color and tonal reproductions in the final printed images. For post-processing, Epson also provides software plug-ins for Adobe Photoshop 7.0 and above, which are used to optimize RAW data for color fidelity in printing. The plug-ins are compatible with both Apple Macintosh and Windows personal computers. Batch printing is also an option when using Windows PCs.

Epson estimates that some 30,000 rangefinder cameras are sold yearly around the globe, and it is aggressively targeting annual sales of 10,000 units for the R-D1. The company believes that the new product will both bolster Epson's image as the company that better understands the needs of high-end photographers, as well as strengthening its promotion of the "Epson equals photo" concept.

John Boyd is a freelance writer based in Yokohama. He writes for a number of publications and has covered the IT industry for the past 17 years.